

AUG 11 2003
U.S. PATENT & TRADEMARK OFFICE
1650

Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call If Necessary:
Scott A. Blake - (419) 255-5900
Serial No. 09/827,046 Sheet 1 of 7 Docket No. 1-82091
177

FIG. 1

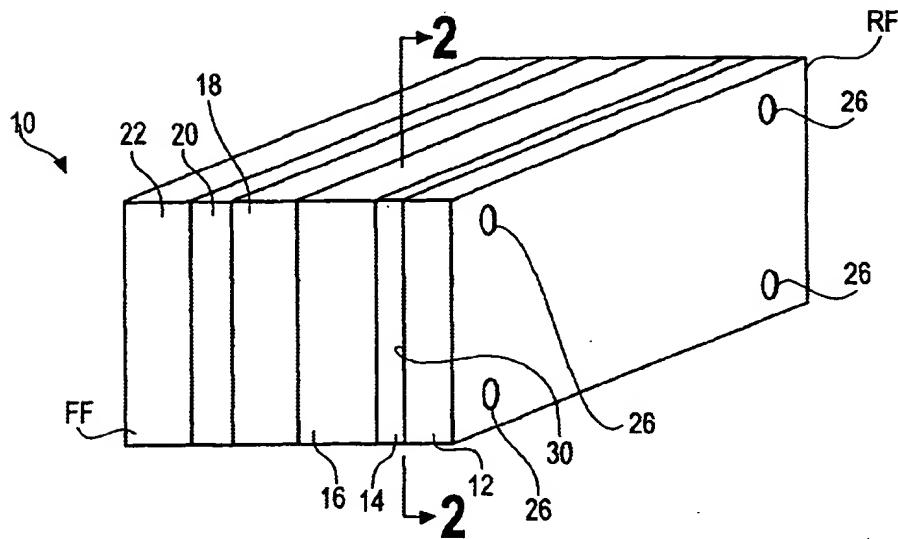
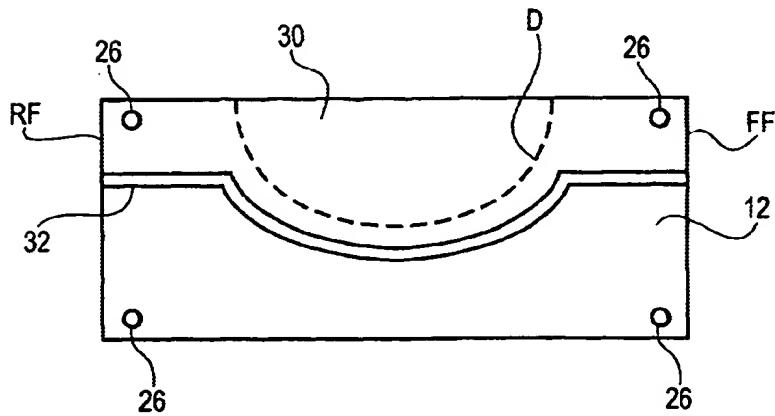


FIG. 2



AUG 11 2013
U.S. PATENT & TRADEMARK OFFICE
CJC

Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call if Necessary:
Scott A. Blake - (419) 255-5900
Serial No. 09/827,046 Sheet 2 of 7 Docket No. 1-82091

2/7

FIG. 3

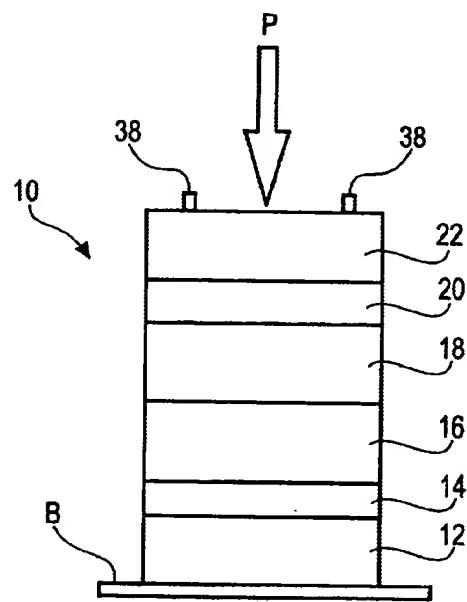
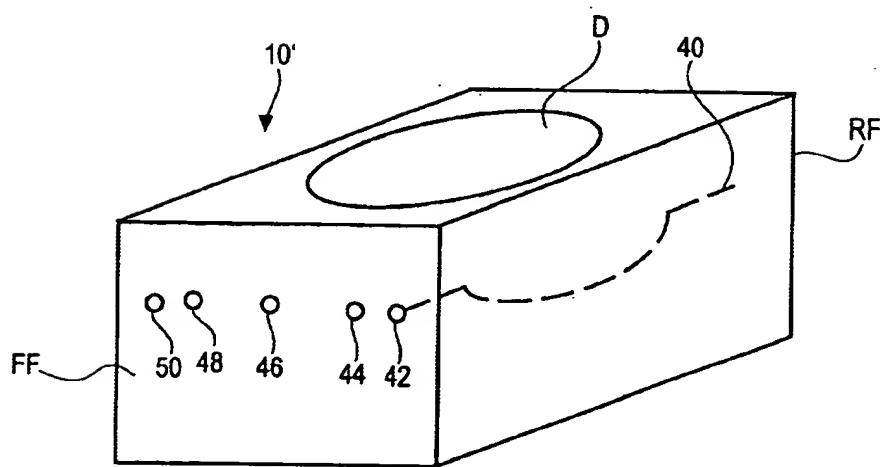


FIG. 4





Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call If Necessary:
Scott A. Blake - (419) 255-5900
Serial No. 09/827,046 Docket No. 1-82091
Sheet 3 of 7

3/7

FIG. 5A

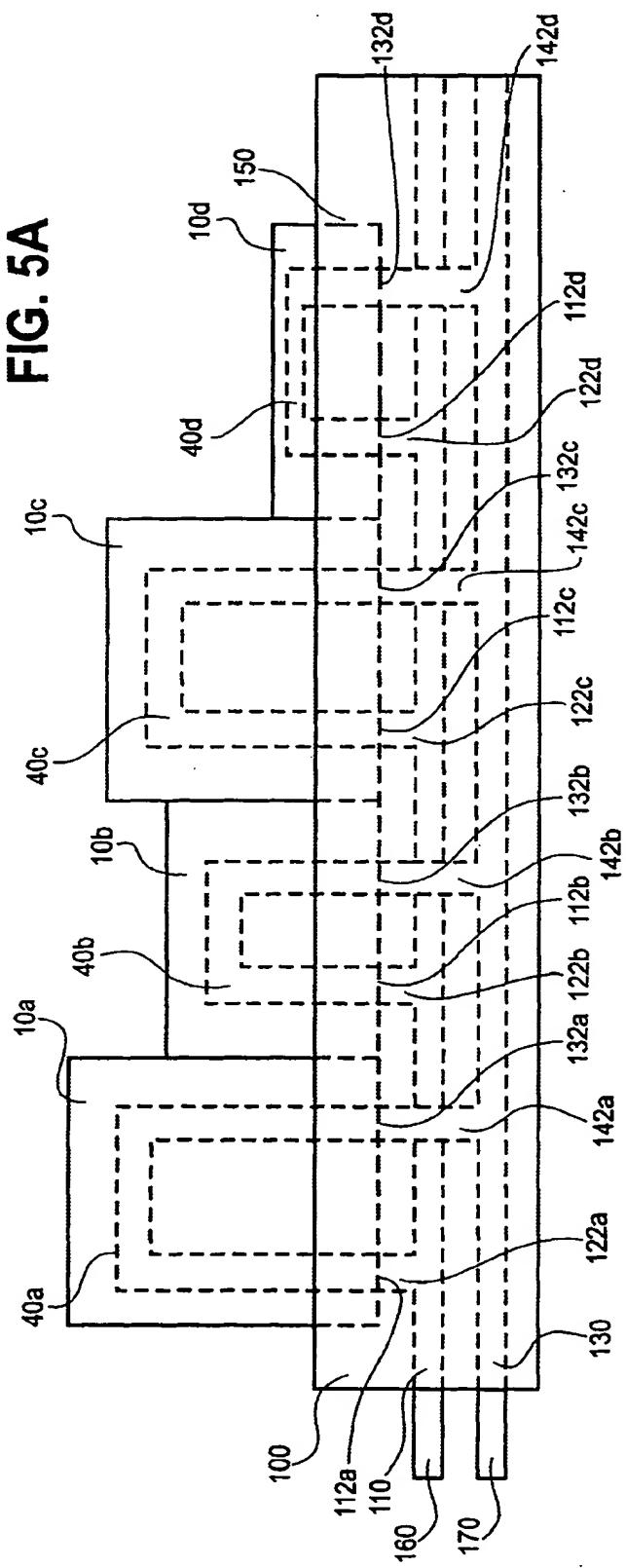
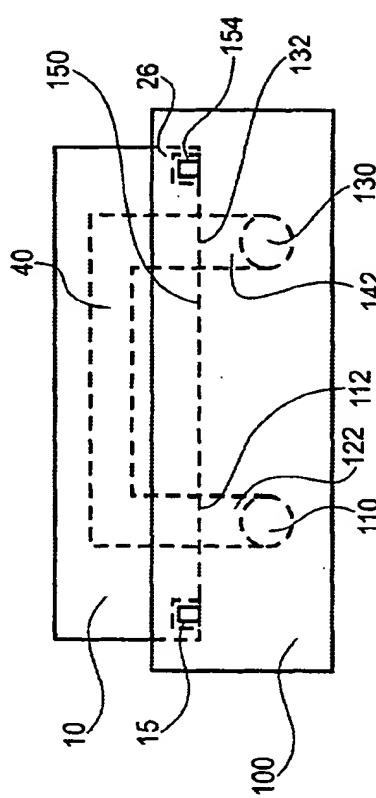


FIG. 5B



COOLING

Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call If Necessary:
Scott A. Blake - (419) 255-5900
Serial No. 09/827,046 Docket No. 1-82091
Sheet 4 of 7

4/7

FIG. 6A

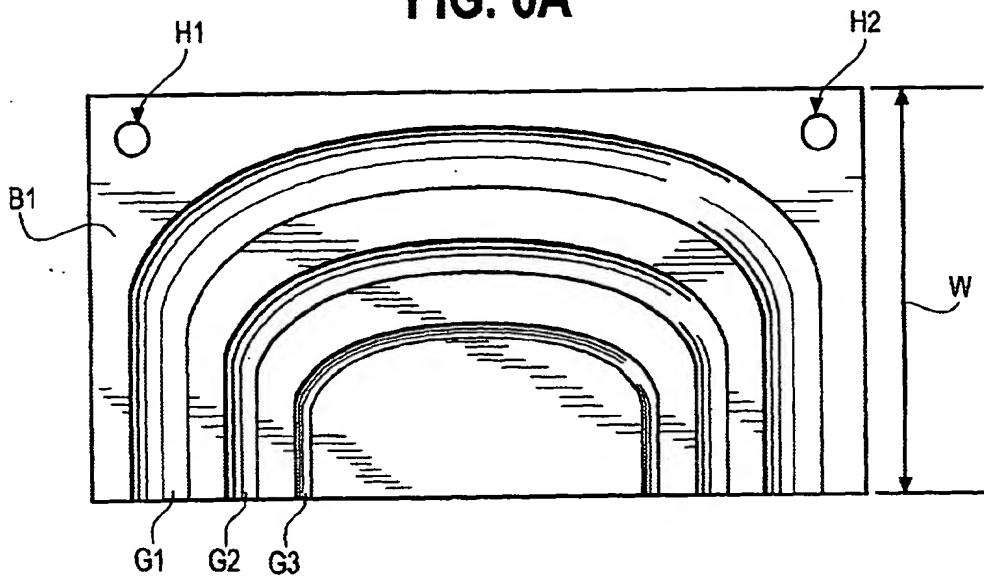
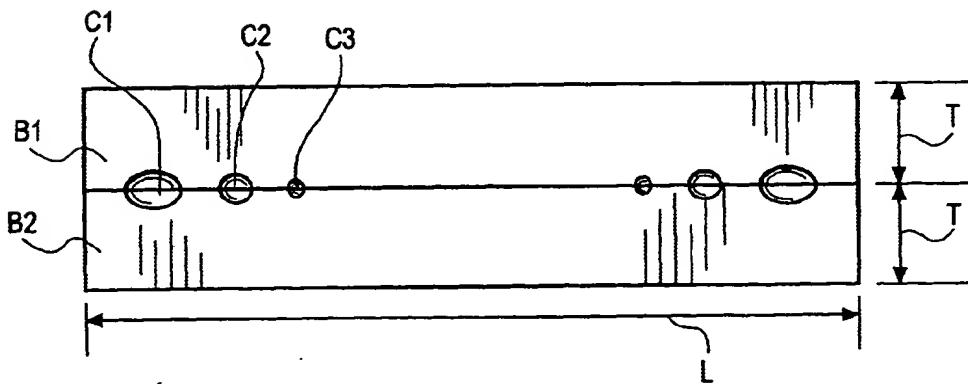


FIG. 6B





Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call If Necessary:
Scott A. Blake - (419) 255-5900
Serial No. 09/827,046 Sheet 5 of 7 Docket No. 1-82091

5/7

FIG. 7

BOND STRENGTH

BOND PRESSURE, ksi	% DEFORMATION	HEAT TREATED	HARDNESS, Rc	STRENGTH, ksi
0.75	0.13	N	28	53
0.75	0.13	Y	54	45
1.5	1.5	N	30	143
1.5	1.5	Y	46	189
3.0	15.1	N	28	158
3.0	15.1	Y	46	219

S7 STRENGTH:

ANNEALED = 93ksi

HEAT TREATED = 300 KSI

S7 HARDNESS = 50 Rc



COOLING

Name of Inventor: Joseph V. Bak, et al.
 Name & Telephone Number of Person to Call If Necessary:
 Scott A. Blake - (419) 255-5900
 Serial No. 09/827,046 Sheet 6 of 7 Docket No. 1-82091

6/7

FIG. 8A

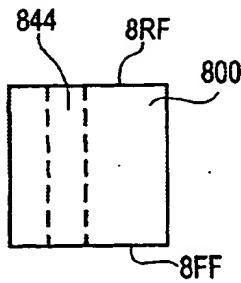


FIG. 9A

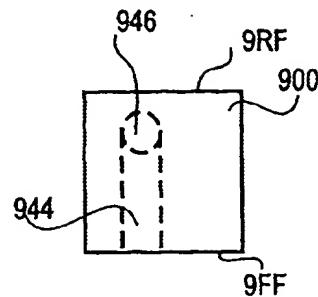


FIG. 8B

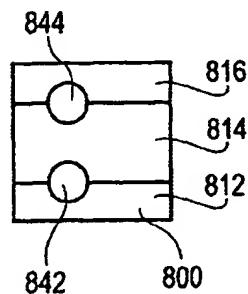


FIG. 9B

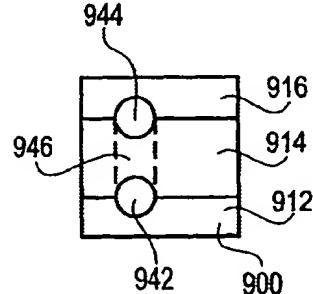


FIG. 10A

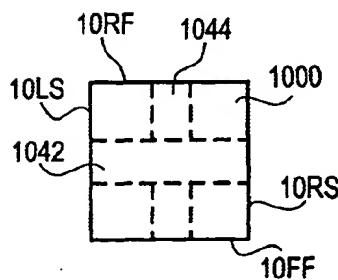


FIG. 11A

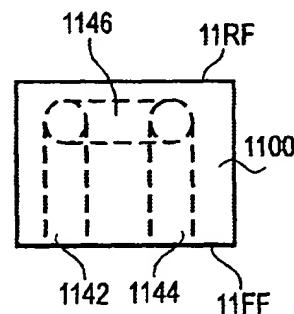


FIG. 10B

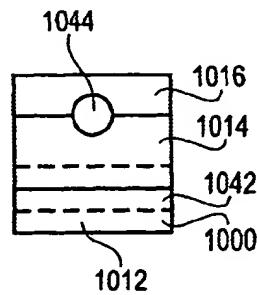
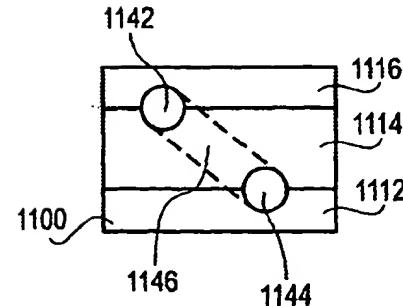


FIG. 11B





Name of Inventors: Joseph V. Bak, et al.
 Name & Telephone Number of Person to Call If Necessary:
 Scott A. Blake - (419) 255-5900
 Serial No. 09/827,046 Sheet 7 of 7 Docket No. 1-82091

7/7

FIG. 12A

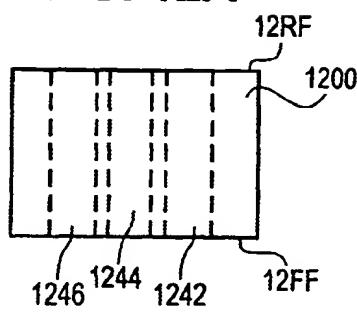


FIG. 13A

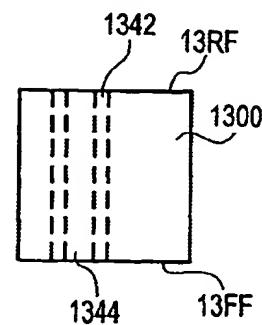


FIG. 12B

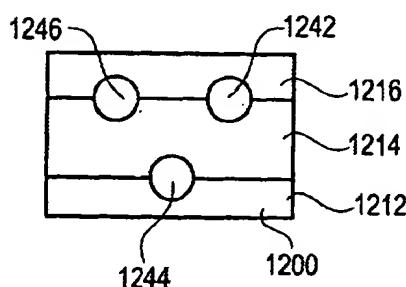


FIG. 13B

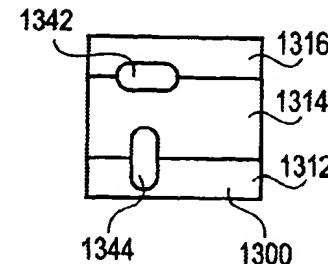


FIG. 14A

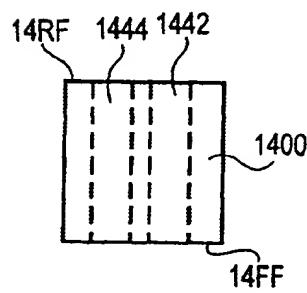


FIG. 15A

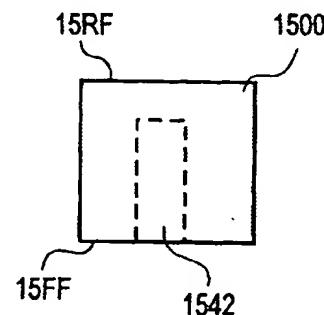


FIG. 14B

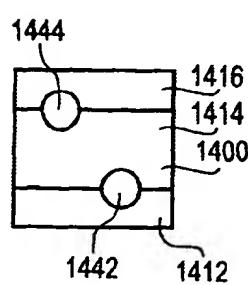


FIG. 15B

